

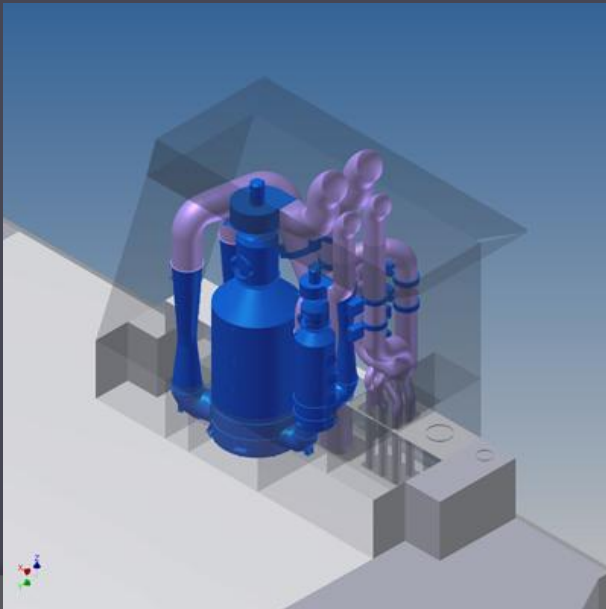
INTERNATIONAL SHIPPING INDUSTRY FORUM 2014



MARPOL ANNEX VI ECA REQUIREMENTS

01 January 2015 Changes

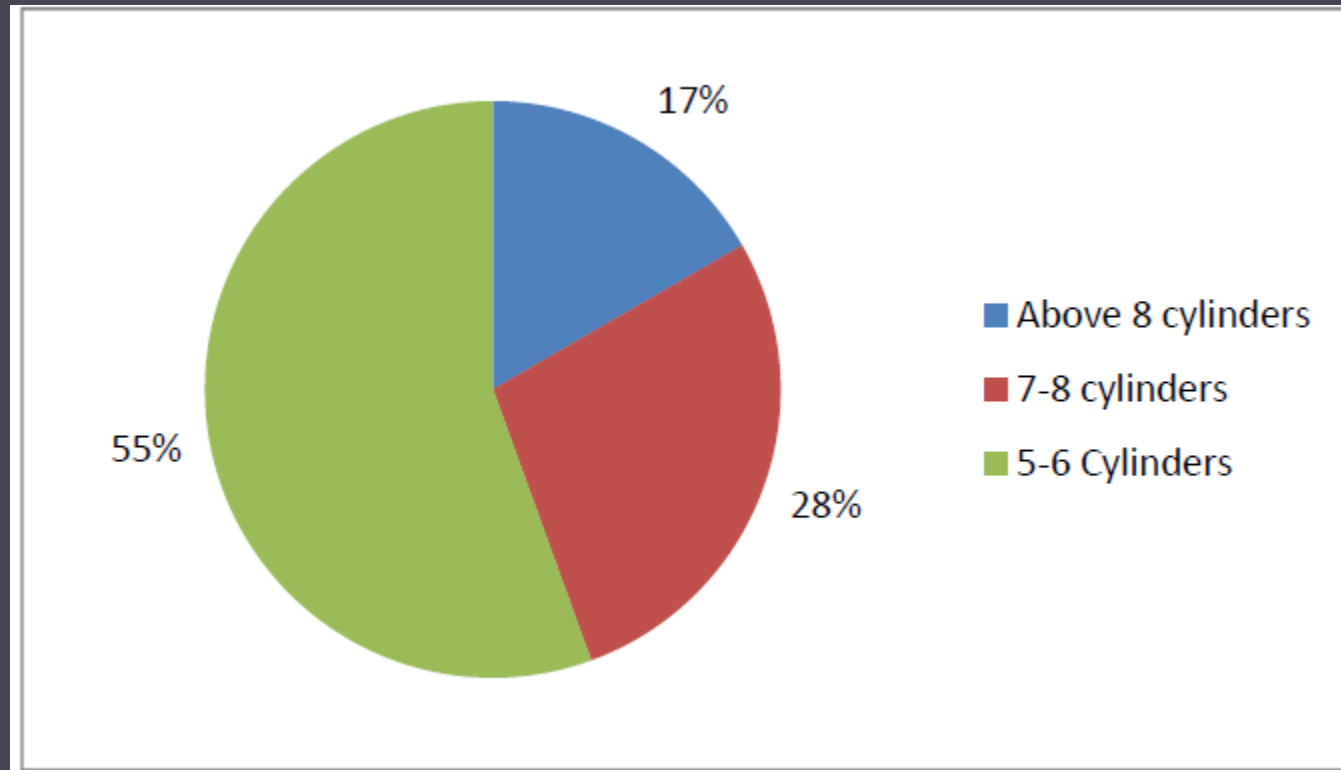
- ⦿ 0.1% Sulfur content inside ECA
- ⦿ Alternate means
 - Exhaust Scrubber
 - Natural Gas



Problems Reported by California

- ⦿ Fail to Start
- ⦿ Unstable at Dead Slow
- ⦿ Fail to Reverse
- ⦿ External Leakage
- ⦿ Loss of Propulsion

Correlation of Fuel issues with # of Cylinders

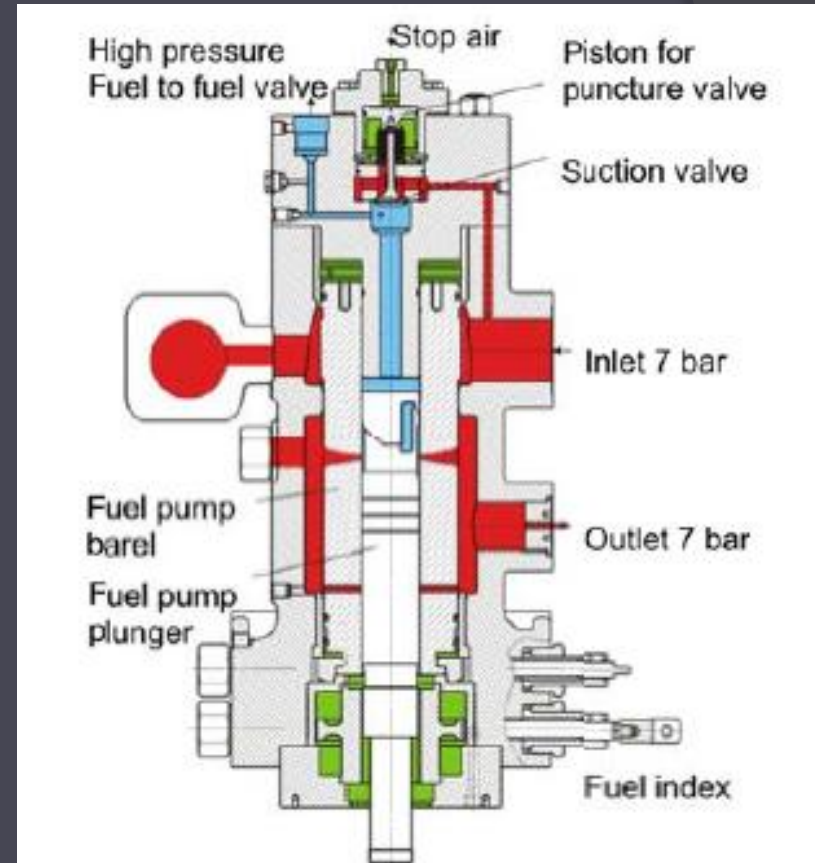


Challenges

- Less Lubrication
- Lower Viscosity 180 cSt vs 5 cSt
- Possibility of Thermal Shock
- Less Lubrication + Lower Viscosity =
Potential for Propulsion Losses



High Pressure Fuel Pumps



Standards of Care

- ⦿ Note that the viscosity of MDO/MGO can vary from 1.5 to 11 cst at 40° C
- ⦿ Consult with Engine Manufacture
- ⦿ Develop DETAILED fuel switching procedures and diagrams.
- ⦿ Increase maintenance schedule to account for lower lubricity of fuel.
- ⦿ Ensure that the fuel oil viscosity and temperature control equipment is accurate and operational.

Questions?